

REMARKS/ARGUMENTS

Claims 1-5, 12, 18, 20, 23, 26-28 and 34 are pending. By this Amendment, claims 1-3, 12 and 20 have been amended, and claims 6-11, 13-17, 19, 21, 22, 24, 25, 29-33 and 35-39 have been canceled. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

At least claims 6, 7, 9, 11, 16, 17, 25, 30-33 and 35-39 have been canceled in response to the indication in the Office Action that these claims are drawn to non-elected species. The cancellation of these claims is subject to Applicant's right to file one or more divisional applications to pursue this subject matter.

Claims 8, 10, 13-15, 19, 21, 22, 24 and 29 were rejected under 35 U.S.C. §112, second paragraph. By this Amendment, the claims which were rejected have been canceled, thereby rendering the rejection moot.

Reconsideration and withdrawal of the rejection are respectfully requested.

Claims 1-5, 8, 10, 12-15, 21, 22, 27-29 and 34 were rejected under 35 U.S.C. §102(b) over Bando (U.S. Patent No. 5,265,565). This rejection is respectfully traversed.

Claim 1 is directed to a reciprocating engine comprising a first piston ring adjacent to a top surface of a piston defining a combustion chamber, a second piston ring which defines an annular gas chamber in cooperation with said first piston ring and which is adjacent to said first piston ring such that a pressure-receiving area of a side surface of said piston in said annular gas chamber becomes greater on a thrust side than on a counter-thrust side, and a plurality of gas passages which are disposed in an inner surface of a cylinder in such a manner as to be juxtaposed in a circumferential direction of the inner surface of said cylinder and which allow said annular gas chamber to communicate with said combustion chamber on the thrust side,

wherein said plurality of gas passages comprise a first recessed portion which is disposed in such a manner as to oppose a center portion of said piston concerning a direction which is perpendicular to both a reciprocating direction of said piston and an axial direction of a piston pin when said piston is at a top dead center or during a starting period of the fall from the top dead center, and a pair of second recessed portions, said first recessed portion being disposed between said pair of second recessed portions in said circumferential direction.

In particular, Bando does not teach or suggest a plurality of gas passages which are disposed in an inner surface of the cylinder in such a manner as to be juxtaposed in a circumferential direction of the inner surface of said cylinder and which allows said annular gas chamber to communicate with said combustion chamber on thrust side, as recited in claim 1. With this structure, it is possible that the plurality of gas passages respectively allow an annular gas chamber to communicate with a combustion chamber and that the plurality of gas passages respectively prevent the annular gas chamber from communicating with the combustion chamber. In addition, this feature makes it possible to allow superior gas floatation of the piston.

Bando also does not teach that the plurality of gas passages comprise a first recessed portion which is disposed in such a manner as to oppose a center portion of said piston concerning a direction which is perpendicular to both the reciprocating direction of said piston and an axial direction of said piston when said piston is at a top dead center or during a starting period from the fall of the top dead center, and a pair of second recessed portions, said first recessed portion being disposed between said pair of second recessed portions in said circumferential direction. This structure makes it possible to introduce a combustion gas evenly and quickly to a large space on the thrust side of the annular gas chamber.

BANDO

Appl. No. 10/537,167

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While Bando discloses a first gas passage for communicating a half annular space on the thrust side to an engine combustion chamber and a second gas passage for communicating the half annular space on the opposite-to-thrust side of the engine combustion chamber, Bando does not teach or suggest either of the features described above in claim 1.

Reconsideration and withdrawal of the rejection are respectfully requested.


In view of the above amendments and remarks, Applicant respectfully submits that all the claims are patentable and that the entire application is in condition for allowance.

Should the Examiner believe that anything further is desirable to place the application in better condition for allowance, she is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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